

## Friction Extrusion, Friction Consolidation, and Shear Assisted Processing and Extrusion

### Peer-Reviewed Publications

1. X. Li, C. Zhou, N. Overman, X. Ma, N. Canfield, K. Kappagantula, J. Schroth, G. Grant, "Copper Carbon Composite Wire with a Uniform Carbon Dispersion made by Friction Extrusion," *Journal of Manufacturing Processes*, 65, pp. 397-406, 2021.
2. M. Komarasamy, X. Li, S. Whalen, X. Ma, N. Canfield, M. Olszta, T. Varga, N. Overman, A. Yu, G. Grant, S. Mathaudhu, "Microstructural Evolution in Cu-Nb Processed via Friction Consolidation," *Journal of Materials Science*, 56, pg. 12864-12880, 2021.
3. S. Tiji, A. Asgharzadeh, T. Park, S. Whalen, Md. Reza-E-Rabby, M. Eller, F. Pourboghra, "Microstructure and Mechanical Properties Characteristics of the AA7075 Tube Fabricated using Shear Assisted Processing and Extrusion (ShAPE)," *Archives of Civil and Mechanical Engineering*, 21 (44), 2021.
4. N. Overman, X. Li, M. Olszta, E. Nickerson, C. Overman, S. Mathaudhu, G. Grant, S. Whalen, "Microstructural Progression of Shear Induced Mixing in a CuNi Alloy," *Materials Characterization*, 110759, 2020.
5. T. Wang, B. Gwalani, J. Silverstein, J. Darsell, S. Jana, T. Roosendaal, A. Ortiz, W. Daye, T. Pelletiers, S. Whalen, "Microstructural Assessment of a Multiple-Intermetallic-Strengthened Aluminum Alloy Produced from Gas-Atomized Powder by Hot Extrusion and Friction Extrusion," *Materials*, 13(23) , 5333, 2020.
6. J. Croteau, J. Jung, S. Whalen, J. Darsell, A. Mello, D. Holstine, K. Lay, M. Hansen, D. Dunand, N. Vo, "Ultra-Fine Grained Al-Zr Processed by Shear Assisted Processing and Extrusion with High Thermal Stability," *Scripta Materialia*, 186, pp. 326-330, 2020.
7. Y. Li, S. Hu, E. Barker, N. Overman, S. Whalen, S. Mathaudhu, "Effect of Grain Structure and Strain Rate on Dynamic Recrystallization and Deformation Behavior: A Phase Field Crystal Plasticity Model," *Computational Materials Science*, 180, 10907, 2020.
8. X. Li, N. Overman, T. Roosendaal, M. Olszta, C. Zhou, H. Wang, T. Perry, J. Schroth, G. Grant, "Microstructure and Mechanical Properties of Pure Copper Wire Produced by Shear Assisted Processing and Extrusion," *JOM*, 71, pp. 4799-4805, 2019.
9. S. Whalen, M. Olszta, C. Roach, J. Darsell, D. Graff, T. Roosendaal, W. Daye, T. Pelletiers, S. Mathaudhu, N. Overman, "High Ductility Aluminum Alloy made from Powder by Shear Assisted Processing and Extrusion (ShAPE)," *Materialia*, 6, 100260, 2019.

10. S. Whalen, N. Overman, V. Joshi, D. Graff, C. Lavender, "Magnesium Alloy ZK60 Tubing made by Shear Assisted Processing and Extrusion (ShAPE)," *Materials Science and Engineering A*, 755 (7), pp. 278-288, 2019.
11. J. Darsell, N. Overman, S. Whalen V. Joshi, S. Mathaudhu, "Shear Assisted Processing and Extrusion (ShAPE) of AZ91E Flake: A Study of Tooling Features and Processing Effects," *Journal of Materials Engineering and Performance*, 227(8) pp. 4150-4161, 2018.
12. X. Li, D. Baffari, A. Reynolds, "Friction Stir Consolidation of Aluminum Machining Chips," *International Journal of Advanced Manufacturing Technology*, 94 (5-8), pp. 2031-2042, 2018.
13. H. Zhang, X. Li, X. Deng, A. Reynolds, M. Sutton, "Numerical simulation of friction extrusion process." *Journal of Materials Processing Technology*, 253, pp. 17-26, 2018.
14. N. Overman, S. Whalen, M. Olszta, K. Kruska, J. Darsell, V. Joshi, X. Jiang, K. Mattlin, E. Stephens, T. Clark, S. Mathaudhu, "Microstructural Evolution of Rapidly Solidified AZ91E Flake Consolidated by Shear Assisted Processing and Extrusion (ShAPE)," *Materials Science and Engineering A*, 701, pp. 56-68, 2017.
15. X. Jiang, S. Whalen, J. Darsell, S. Mathaudhu, N. Overman, "Friction Consolidation of Gas-Atomized Fe-Si Powders for Soft Magnetic Applications," *Materials Characterization*, 123, pp. 166-172, 2017.
16. D. Baffari, A. Reynolds, X. Li, L. Fratini, "Influence of Processing Parameters and Initial Temper on Friction Stir Extrusion of 2050 Aluminum Alloy," *Journal of Manufacturing Processes*, 28, pp. 319-325, 2017.
17. N. Abbas, X. Deng, X. Li, A. Reynolds. "Compaction of machining chips: Experiments and modeling." *International Journal of Mechanical Sciences*, 134, pp. 436-444, 2017.
18. S. Whalen, S. Jana, D. Catalini, N. Overman, J. Sharp, "Friction Consolidation Processing of n-Type Bismuth-Telluride Thermoelectric Material," *Journal of Electronic Materials*, 45(7), pp. 3390-3399, 2016.
19. X. Li, W. Tang, A. P. Reynolds, W. A. Tayon, C. A. Brice, "Strain and texture in friction extrusion of aluminum wire", *Journal of Materials Processing Technology*, 229, pp. 191-198, 2016.
20. D. Catalini, D. Kaoumi, A. Reynolds, G. Grant, "Dispersoid Distribution and Microstructure in Fe-Cr-Al Ferritic Oxide Dispersion-Strengthened Alloy Prepared by Friction Consolidation," *Metallurgical and Materials Transactions A, Physical Metallurgy and Materials Science*, 46(10), pp. 4730-4739, 2015.
21. H. Zhang, X. Li, W. Tang, X. Deng, A. P. Reynolds, M. A. Sutton, "Heat Transfer Modeling of the Friction Extrusion Process", *Journal of Materials Processing Technology*, 221, pp. 21-30, 2015.
22. D. Catalini, D. Kaoumi, A. Reynolds, G. Grant, "Friction Consolidation of MA956 powder," *Journal of Nuclear Materials*, 442 (1-3), pp. 112-118, 2013.
23. D. Catalini, D. Kaoumi, A. Reynolds, G. Grant, "Friction Consolidation of an Oxide Dispersion Strengthened Steel", *Transactions of the American Nuclear Society*, 107, pp. 458-461, 2012.

## Conference Papers

1. D. Zhang, J. Darsell, N. Overman, D. Herling, V. Joshi, "Eliminating Yield Asymmetry and Enhancing Ductility in Mg Alloys by Shear Assisted Processing and Extrusion," *Magnesium Technology*, 2012, pp. 91-99.
2. S. Whalen, M. Reza-E-Rabby, T. Wang, X. Ma, T. Roosendaal, B.S. Taysom, "Shear Assisted Processing and Extrusion of Aluminum Alloy 7075 Tubing at High Speed, *Light Metals*, 2021, pg. 277-280.
3. B.S. Taysom, S. Whalen, Md. Reza-E-Rabby, M. DiCiano, T. Skszek, "Shear Assisted Processing and Extrusion of Thin-Walled AA6063 Tubing," *Light Metals*, 2021, pg. 281-285.
4. D. Zhang, J. Darsell, N. Overman, D. Herling, V. Joshi, "Eliminating Yield Asymmetry and Enhancing Ductility in Mg Alloys by Shear Assisted Processing and Extrusion," *Magnesium Technology*, pg. 91-99, 2021
5. V. Beura, P. Garg, V. Joshi, and K. Solanki, "Numerical investigation of micro-galvanic corrosion in Mg alloys: Role of the cathodic intermetallic phase size and spatial distributions," *Magnesium Technology* pp. 217-223.
6. X. Li, G. Grant, C. Zhou, H. Wang, T. Perry, J. Schroth, "Copper-Graphite Composite Wire Made by Shear-Assisted Processing and Extrusion", *Friction Stir Welding and Processing X. The Minerals, Metals & Materials Society*, 2019.
7. D. Baffari, A. Reynolds, X. Li, L. Fratini, "Bonding prediction in friction stir consolidation of aluminum alloys: A preliminary study." *AIP Conference Proceedings*, 1960(1), 050002, 2018.
8. N. Abbas, X. Deng, X. Li, A. Reynolds, "Modeling of heat transfer in compacted machining chips during friction consolidation process." In *AIP Conference Proceedings*. 1957(1), p. 050005, 2018.
9. M. Jamalian, V. Joshi, S. Whalen, C. Lavender, D. Field, "Microstructure and Texture Evolution of Magnesium Alloy after Shear Assisted Processing and Extrusion (ShAPE)," *IOP Conference Series: Materials Science and Engineering*, 375, 102007, 2018.
10. S. Whalen, V. Joshi, N. Overman, D. Caldwell, C. Lavender, T. Skszek, "Scaled-Up Fabrication of Thin-Walled Magnesium ZK60 Tubing using Shear Assisted Processing and Extrusion (ShAPE)," *Magnesium Technology*, pp. 315-321, 2017.
11. X. Li, A. Reynolds, C. Baoqiang, D. Jialuo, S. Williams, "Production and properties of a wire-arc additive manufacturing part made with friction extruded wire." *The Minerals, Metals & Materials Society*, pp. 445-452, 2015.
12. H. Zhang, X. Deng, X. Li, W. Tang, A. Reynolds, M.A. Sutton, "Thermo-Fluid Modeling of the Friction Extrusion Process." *Challenges in Mechanics of Time-Dependent Materials*, 2, pp. 187-196, 2015.
13. V. Joshi, S. Jana, D. Li, H. Garmestani, E. Nyberg, C. Lavender, "High Shear Deformation to Produce High Strength and Energy Absorption in Mg Alloys", pp. 83-88, *Magnesium Technology*, 2014.

14. X. Li, W. Tang, A. Reynolds, "Material Flow and Texture in Friction Extruded Wire," Friction Stir Welding and Processing VII, pp. 339-347, 2013.
15. X. Li, W. Tang, A. Reynolds, "Visualization of material flow in friction extrusion." ICAA13 , pp. 1659-1664), 2012.